

ROMMON
INSTALLATION INSTRUCTIONS

WARNING --- The installation of this modification requires some mechanical skill and the ability to solder in one short piece of wire. WE WILL NOT BE HELD RESPONSIBLE FOR DAMAGE DONE TO YOUR MP1000 BY IMPROPER INSTALLATION. It is a good idea to read all of the installation instructions before starting the actual installation.

This modification uses part of the memory space that APF allocated for internal ROM (read only memory) but did not use. When using Rocket Patrol or any of the plug-in games, your APF will work the same way as it did before this modification was made.

1. Remove the J connector and power cord from your MP1000 unit.
2. Turn the unit upside down and loosen the four corner screws with a Phillips screwdriver. Remove the plastic case bottom. Remove the two screws which are near the joystick cables and accessible through the holes in the metal cover.
3. Carefully turn the unit upside up. Lift off the top cover making sure that the three cables and power socket are freed from the cover. Straighten the bent metal tab next to the reset switch. This tab is not really necessary, so don't worry if it breaks off.
4. Lift the metal cover off. If your unit has the metal J connector grounding clip, remove it and set it aside. The clip can be re-installed after the MP1000 is back together. Lift off the felt dust shield.
5. Identify the chip which is to be replaced (see fig. 1). Using a nail file or two small screw drivers, carefully pry out this A9 ROM chip. Note which way the notched end is oriented.
6. Study Figure 1 to determine which circuit board trace needs to be cut. Carefully cut this trace with a sharp knife. To make sure that the connection is broken, make a second cut and remove a piece of the trace about 1/16 inch long. Remove the insulation from the jumper wire, and, using a soldering iron suitable for work on printed circuit boards, solder the wire in place as shown in figure 1A.
7. Read Only Memory chips can be damaged by static electricity. If possible, do this next part of the installation in an un-carpeted room. It would also be a good idea to ground yourself and the MP1000 by touching a water pipe and the MP1000 circuit board at the same time. Next, carefully remove your new ROM chip from it's protective

packaging and install it in the socket making sure that the notched end of the chip is at the notched end of the socket (the same way that the old ROM was oriented). The chip's pins can be bent in slightly if they don't line up correctly with the socket.

8. At this time, double check to be absolutely sure that you have the notched end of the chip oriented correctly and that all of the chip's pins are properly seated in the socket. Also double check your soldering to make sure that no solder is making any other connection than the one shown in figure 1A.

9. Replace the dust shield over the cartridge socket. Replace the metal cover. Place the top plastic cover into position with the cables and the power socket in their correct positions.

10. Carefully turn the unit upside down and check to see that the unit is seated correctly in the plastic case top and that the cables and power socket are routed correctly (The joystick cable nearest the power socket should be routed under the metal case toward the top cover of the MP1000).

11. Replace the two screws nearest the joystick cables. Replace the bottom plastic cover and tighten the four corner screws. If you have the cartridge grounding clip mentioned earlier, you can press it back into place at this time.

12. Your unit is now ready for testing. Connect the unit to your TV. Plug in the power supply and turn the unit on. Your unit should work exactly as it did before. Rocket patrol should be displayed and should play normally.

You can now place the MP1000 back on the computer keyboard, re-install the J connector and start enjoying the many features of ROMMON.

FIG. 1

INTEGRATED CIRCUIT PLACEMENT WITHIN THE MP-1000

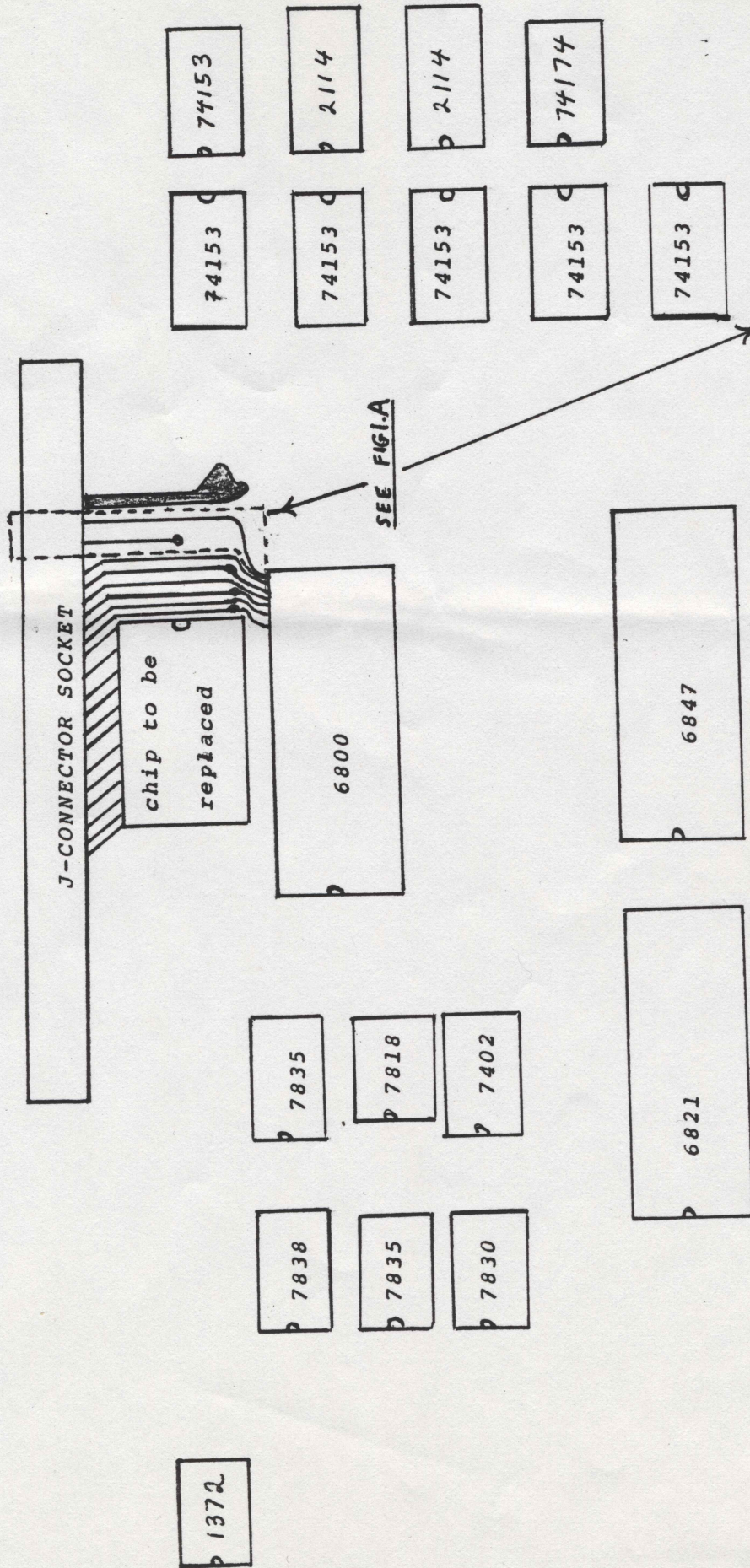
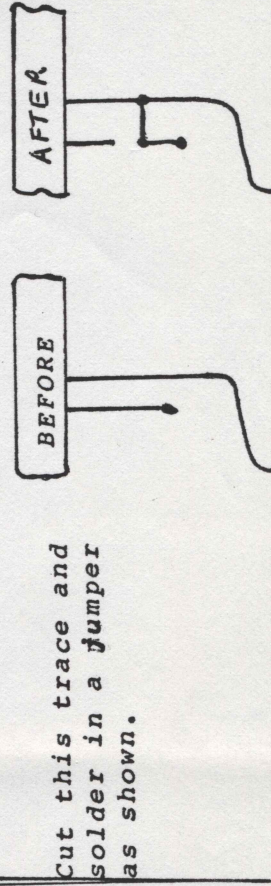


FIG. 1A.



ROMMON

OPERATING INSTRUCTIONS

Although this modification has many features for the machine language programmer, it also has many features usable from APF BASIC. Since ROMMON uses part of the machine language programming within the BASIC cartridge, ROMMON will only be accessible while the BASIC cartridge is in place. Your MP1000 will ignore the modification when running game cartridges.

When you first turn on the computer, it will work the exact same way as it did before you installed ROMMON. BASIC will be displayed on the screen until you press any joystick button.

After getting into BASIC you can go ahead and do all the usual BASIC things. To enter your new monitor CALL 18450 or press the RESET key. Instead of seeing the BASIC message again, you should see a "#" on the screen. This indicates that you are in the monitor program. On some TV sets you may notice less noise coming from the set. Also, the sound on the tape player will turn off if you had just loaded a tape. While pressing the reset key will put you in the monitor program, the better way to enter the monitor is to type CALL 18450 and press RETURN. Pressing the RESET key does some other things within the APF and MIGHT alter a memory location or two within any program you have loaded from tape or typed in.

To go back to BASIC, press the "HERE IS" key. Your BASIC program will still be there. You will also notice that the screen was cleared to text green and the cursor was sent to its home position. This -clear screen/home cursor- routine is available as a simple call from BASIC. By using a single poke, you can also change the color or graphic character that is used to "clear" the screen.

I think that we all have had the experience of programming something like "PRINT INT(5/3" leaving off the final bracket. If you are lucky, you will get an error message. If you are not, you will see the computer reset itself and erase your program. With ROMMON installed, one of two things will happen. The machine will go directly to ROMMON or the machine won't do anything. In the first case you can press "HERE IS" to go back to BASIC. In the second case you can press the RESET key followed by "HERE IS" to get back to BASIC. In either case, your BASIC program will be intact (see possible exception above).

ROMMON MONITOR COMMANDS

In the command descriptions the hexadecimal numbering system will be referred to(hex). In this system, instead of working

with numbers 0-9 we use numbers 0-F where F=15.

EXAMPLE:

Decimal numbers: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Same # in Hex : 0 1 2 3 4 5 6 7 8 9 A B C D E F 10

A byte of information is represented by two hex digits. Memory locations for the APF are numbered 0 - 65535. In hex these same numbers are \$0000 - \$FFFF. The "\$" indicates that the number is in hex.

RESET KEY -- Press reset any time (after entering BASIC at least once) to enter the monitor program. In machine language you can jump to \$4812. In BASIC CALL 18450.

ESC -- Press the ESCape key while in various monitor routines to get back to the monitor's command mode ("#" displayed).

HERE IS -- Press this key to return to BASIC.

EQUALS KEY -- Press this key to erase any BASIC program in memory (remember to use the shift key). This will return you to BASIC with no program in memory. This routine zeros all memory from \$A402 to the address stored at \$A1E6.

B -- Allows you to set a machine language breakpoint in your machine language program in random access memory. You must enter a 2 byte hex address after the B. If a breakpoint has previously been set, it will be automatically cleared before your new breakpoint is set.

C -- Allows you to clear/fill a block of memory with a hex value. This routine asks for the beginning hex address and ending hex address of the block you wish to fill and the hex byte you wish to put in all locations within the block.

D -- Dumps memory information to the screen or printer. After you press the "D" key you must enter a two byte hex address. The address will then be displayed on the screen followed by the hex contents of the four memory locations starting at that address. On the same line will be the ASCII equivalents for those hex values. If there is no ASCII equivalent for a byte, a period will be displayed for that byte. Press the ";" key (non-shifted "+") to see the next four locations. Press the "-" key to see the previous locations. These two keys can also be used with REPT for faster scanning. If the printer is being used for this function, 16 locations will be shown at a time. Remember to press "ESCape" when you want to get back to the command mode.

F -- Press the "F" key to "fix" a breakpoint. This removes a breakpoint from your machine language program. If a breakpoint

was set, an "F" will be displayed. If no breakpoint was set, only a "#" will be displayed.

G -- Press the "G" key to go to your machine language program. After pressing "G" you will need to enter a 2 byte hex address, at which time the computer will start running any program at that address. Up until you enter the final digit of the address you can press "ESC" to get back to command mode.

L -- This command is probably the most powerful and useful routine in ROMMON 2.4. The command allows you to list and edit your BASIC lines easily and quickly. After pressing -L- the first line of BASIC text will be displayed on the screen ("#" will be displayed if there is no BASIC text in memory). You can now press the + or - key to see the next or previous line of BASIC text (use with the REPT key for fast scanning). Notice that your BASIC lines are displayed with fewer spaces than when they are listed from BASIC. This is because BASIC removes un-necessary spaces when it saves lines in memory and adds them back in when it lists a program.

To edit the line which is displayed on the screen, press the E key. Now, the + and - keys can be used to move the special orange cursor back and forth over the line. To change the character under the cursor, press -C-. The space will become black and will be filled with the next key that you press. Press -I- to insert a character where the cursor is. Press -D- to delete the character under the cursor. You can change any character in the line including the line number. If you change the line number, the old line will remain in the program and a new line will be created. Press RETURN when you are through with your changes. It doesn't matter where the cursor is before you press RETURN. This routine exits to BASIC.

This edit function will not allow the last character on a line to be deleted. If your edits cause the line to have errors which BASIC normally catches, you will get a BASIC error message after pressing RETURN.

M -- Press "M" to modify memory contents. You must enter a two byte hex address. The address will then be displayed followed by the hex contents of that address. To see the next address, press ";" (un-shifted "+"). To see the previous address press "-". The repeat key can be used with "+" & "-" for fast scanning. To change the memory contents, enter the new hex value. The keyboard will only accept hex input (0-9/A-F). After a hex value has been entered, the monitor automatically goes to the next location.

D -- Opcode lister works like a disassembler except it doesn't display the instruction mnemonic (name). It asks for a starting address and then displays the 1,2 or 3 bytes of

information that make up the instruction at that location. Pressing any key will display the next instruction codes. Any ASCII (letter) equivalents of the code will also be displayed. Press ESC to exit this routine.

P -- Press "P" for the printer. The screen will display "PRINTER?". Press "Y" or "N". This function is available from BASIC by "CALL"ing 20450. In machine language use JSR \$4FE2. If you are in BASIC it would probably be just as easy to use the standard printer command (PRINT=1 for on, and PRINT=0 for off). This routine does not check to see if you have a printer. If you don't, the machine will lock up. The "RESET" key will still allow you to recover control with no loss of program. If you activate your printer, any monitor function will be displayed on both the screen and printer.

R -- Press "R" to see contents of the Motorola 6800 microprocessor registers. These registers are only saved when ROMMON is entered at \$4B12. The breakpoint routine re-enters at this address.

S -- Press "S" to search memory for a particular byte or several bytes of information. The routine will ask for the starting address and ending address of the block of memory that you want to search. It will then ask how many bytes of information you are searching for (1 - F=15). Then you must enter that number of bytes of information. When you have entered the last byte, the routine will automatically start the search and display any address where the requested information was found.

T -- Press "T" to transfer a block of memory from one location to another. The destination location must be in random access memory of course. After pressing "T" you will be asked for the starting address (block start?), ending address (block end?), and new location (move to?).

Z -- Press "Z" to clear the screen. A message is also displayed when the "Z" is pressed. The message is not displayed when you use the routine as a call from BASIC. To use this routine from BASIC, call 20453. From machine language, JSR \$4FE5.

There is a second routine which clears the screen and homes the cursor, but instead of using text green, it uses whatever value is in memory location \$A1CA. To use this routine from machine language JSR \$4FF1. When the computer is first turned on, the hex value \$20 is initialized for this function. \$20 is an ASCII space so the screen is cleared to text green.

To use this routine from BASIC, CALL 20465. To change the screen value from BASIC, POKE 41418, new value (text green=32 -

red=191 - blue=175 black=128). You can use any low res graphic or ASCII value for this function.

It is not a good idea to press "RESET" while a BASIC program is running. If you do press "RESET" and then go back to BASIC, your program may have some machine generated errors. The same thing may happen when BASIC fails to catch an error. You can still make corrections and continue, of course.

In some extreme situations, a corrected BASIC program won't run after BASIC failed to catch an error. If this ever happens, just CSAVE the program, shut the computer completely off, turn the computer back on and re-load the program. It should now run correctly.

USING ROMMON WITH APF'S 8K RAM EXPANSION CARTRIDGE

If you will be using the additional memory available in the APF memory expansion cartridge, be sure to turn the cartridge switch on before turning on your computer. BASIC only determines how much memory is available when it first starts running. ROMMON stops the RESET key from causing BASIC to do a complete re-start as happened without ROMMON.

You can trick BASIC into thinking that the extra memory is not available. Basic looks at locations \$A1E6 & \$A1E7 to see how much memory is available. If you have 8K of memory, \$A1E6 will have the value \$BF. If you have the extra 8K of memory turned on, \$A1E6 will have the value \$DF. In both cases, location \$A1E7 will have the value \$FF. To trick BASIC into thinking it has only 8K of memory when the memory expansion cartridge is on you only need to change memory location \$A1E6 to the 8K memory value which is \$BF. You can use ROMMON's M(odify) command to make this change or from BASIC you can POKE 41446,191 to make the change. To change back to 16K use ROMMON to change \$A1E6 back to \$DF or from BASIC POKE 41446,223.

MEMORY USED BY ROMMON

\$A2FF	Stack starts here (same as BASIC)
\$A1BD	Store flag information
\$A1C6 - \$A1C7	Store index register
\$A1BE	Store AA
\$A1BF	Store AB
\$A1B7 - \$A1B8	Store Breakpoint address
\$A1B9 - \$A1BB	Store Breakpoint data
\$A1BC	Breakpoint flag (1 = set)
\$A1C8 - \$A1C9	Store stack pointer
\$A1CA	Screen clear value

ROMMON
INSTRUCTION SUMMARY

RESET Activates monitor program (may effect memory).

HERE IS Sends computer back to BASIC from monitor.

ESC Exit from monitor routines.

= Erases BASIC program (remember shift).

B Set machine language breakpoint.

C Clear/fill block of memory with hex byte.

D Display memory contents in hex and ASCII.

F Fix breakpoint (restore program code).

G Go to address.

L List BASIC program.
 + to list next line.
 - to list previous line.
 E to edit line displayed on screen.
 + Move orange cursor forward.
 - Move orange cursor backward.
 C Change character under cursor.
 I Insert character at cursor.
 D Delete character under cursor.
 RETURN When edits are completed.

M Modify memory location.

O Opcode lister.

P Activate/de-activate printer.

R Display 6800 chip registers after breakpoint.

S Search block of memory for hex values.

T Transfer block of memory.

Z Clear screen while in monitor.

CALL 18450 Safest way to enter ROMMON.

CALL 20453 Clear screen - Home cursor (green).

CALL 20456 Move block of memory
 start of block poked to 41408 & 41409.
 end of block poked to 41410 & 41411.
 move to address poked to 41412 & 41413.

CALL 20459 Fill block of memory with value poked to 41418.

CALL 20462 Erase BASIC program.

CALL 20465 Clear screen with value at 41418 - Home cursor.